CLAIMS

1. Process for making high-performance polyethylene multifilament yarn comprising the steps of

    a) making a 3-25 mass% solution of ultra-high molar mass polyethylene having an intrinsic viscosity as measured on solutions in decalin at 135°C of between about 8 and 40 dl/g, in a solvent;

    b) spinning of the solution through a spinplate containing at least 5 spinholes into an air-gap to form fluid filaments, while applying a fluid draw ratio DR_{fluid};

    c) cooling the fluid filaments to form solvent-containing gel filaments;

    d) removing at least partly the solvent from the filaments; and

    e) drawing the filaments in at least one step before, during and/or after said solvent removing, while applying a draw ratio DR_{solid} of at least 4, characterized in that

    in step b) each spinhole comprises a contraction zone with a gradual decrease in diameter from D_0 to D_n with a cone angle in the range 8-75°, and wherein the spinhole comprises a zone downstream of the contraction zone of constant diameter D_n with a length/diameter ratio L_n/D_n of from 0 to at most 25, to result in a fluid draw ratio $DR_{fluid} = DR_{sp} * DR_{ag}$ of at least 150, wherein DR_{sp} is the draw ratio in the spinholes and DR_{ag} is the draw ratio in the air-gap, with DR_{sp} being greater than 1 and DR_{ag} at least 1.

2. Process according to claim 1, wherein the cone angle is from 10 to 60°.

3. Process according to any one of claims 1-2, wherein the draw ratio in the spinholes is at least 2.

4. Process according to any one of claims 1-2, wherein the draw ratio in the spinholes is at least 5.

5. Process according to any one of claims 1-2, wherein the draw ratio in the spinholes is at least 10.

6. Process according to any one of claims 1-5, wherein the ratio L_n/D_n is at most 20.

7. Process according to any one of claims 1-5, wherein the ratio L_n/D_n is at most 15.

8. Process according to any one of claims 1-7, wherein the spinhole further comprises an inflow zone of constant diameter of at least D_0, with a ratio L_0/D_0 of at least 5.

9. Process according to any one of claims 1-7, wherein the ratio L_0/D_0 is at least 10.

10. Process according to claim 1, wherein a spinplate comprising at least 10 cylindrical spinholes having a inflow zone of constant diameter D_0 with L_0/D_0 at least 10, a contraction zone with cone angle in the range 10-60°, a downstream zone of constant diameter D_n with L_n/D_n at most 15, and $(D_0/D_n)^2$ of at least 5 is applied.

11. Process according to any one of claims 1-10, wherein the draw ratio DR_{fluid} applied to fluid filaments is at least 250.

12. Process according to any one of claims 1-11, wherein a 3-15 mass% solution of linear UHPE of IV 15-25 dl/g is spun through a spinplate containing at least 10 spinholes into an air-gap, the spinholes comprising a contraction zone with a cone angle in the range 10-60° and comprising a zone of constant diameter D_n with a length/diameter ratio L_n / D_n smaller than 10 downstream of a contraction zone, while applying a fluid draw ratio $DR_{fluid} = DR_{sp} * DR_{ag}$ of at least 200 and a draw ratio DR_{solid} of between 5 and 30.

13. High-performance polyethylene multifilament yarn made from linear ultra-high molar mass polyethylene of IV 8-40 dl/g, containing n filaments and having a tensile strength of at least f * $(n^{-0.065})$ GPa, wherein factor f is at least 5.8 and n is at least 5.

14. High-performance polyethylene multifilament yarn according to claim 13 wherein f has a value from 6.0 to 10.

15. High-performance polyethylene multifilament yarn according to claim 13 or 14, showing a non-reversible peak, as measured by temperature-modulated differential scanning calorimetry, with a maximum at about 152°C and having an enthalpy of at least 35 J/g.

16. High-performance polyethylene multifilament yarn according to any one of claims 13-15, having a creep rate as determined on yarn at 70 °C with a load of 600 MPa of at most $5 * 10^{-6}$ s^{-1}

17. High-performance polyethylene multifilament yarn according to any one of claims 13-16, containing at least 200 filaments.

18. High-performance polyethylene multifilament yarn according to any one of claims 13-16, containing less than 150 ppm of residual solvent having a boiling point at atmospheric conditions of less than 275°C.

19. Semi-finished and end-use articles containing the high-performance polyethylene multi-filament yarn according to any one of claims 13 - 18.

20. Medical implant containing the yarn according to claim 18.

21. Ballistic-resistant assembly comprising a plurality of mono-layers consisting essentially of high-performance polyethylene multifilament yarn, the assembly having an areal density of at least 1.5 kg/m^2 and a specific energy absorption of at least 300 J.m^2/kg as measured against a 9 * 19 mm FMJ Parabellum bullet according to a test procedure based on Stanag 2920.

22. Ballistic-resistant assembly according to claim 21, wherein the mono-layers contain uni-directionally oriented filaments, with the fibre direction in each mono-layer being rotated with respect to the fibre direction in an adjacent mono-layer.

23. Ballistic-resistant assembly according to any one of claims 21-22, wherein the specific energy absorption of the panel is at least 325 J.m^2/kg.

24. Ballistic-resistant moulded panel comprising a plurality of mono-layers consisting essentially of high-performance polyethylene multifilament yarn, the panel having a specific energy absorption of at least 165 J.m^2/kg as measured against an AK-47 bullet according to a test procedure based on Stanag 2920.

25. Ballistic-resistant panel according to claim 24, wherein the mono-layers contain uni-directionally oriented filaments, with the fibre direction in each mono-layer being rotated with respect to the fibre direction in an adjacent mono-layer.